

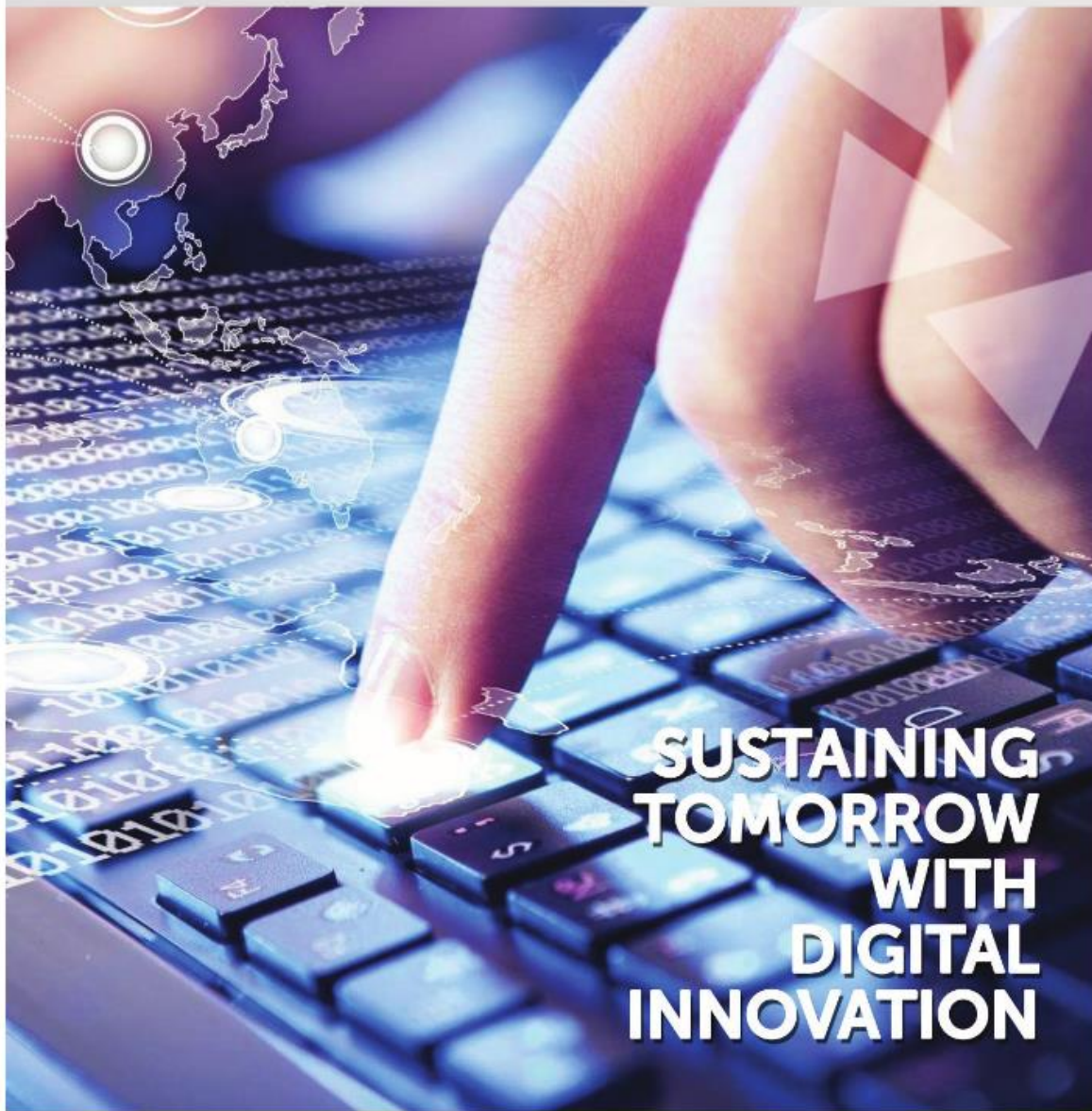
PROCEEDINGS



ESTCON 2020
WORLD ENGINEERING, SCIENCE & TECHNOLOGY CONGRESS
VIRTUAL CONGRESS IN 2021 | 13-15 JULY 2021
SCIENCE, TECHNOLOGY & HUMANITIES: REINVENTING THE FUTURE

International Conference on
Computer & Information Sciences

ICCOINS



SUSTAINING TOMORROW WITH DIGITAL INNOVATION

Organiser



Co-Organisers



PRINT ISBN: 978-1-7281-7151-7
Part Number: CFP2135X-PRT

USB ISBN: 978-1-7281-7152-4
Part Number: 978-1-7281-7152-4

XPLORE: ISBN: 978-1-7281-7153-1
Part Number: CFP2135X-ART

2021 International Conference on Computer & Information Sciences (ICCOINS)

(Proceedings)

© **Copyright 2021 IEEE.** All rights reserved.

Email: copyrights@ieee.org

PRINT

ISBN: 978-1-7281-7151-7

Part Number CFP2135X-PRT

USB

ISBN: 978-1-7281-7152-4

Part Number 978-1-7281-7152-4

XPLORE COMPLIANT

ISBN: 978-1-7281-7153-1

Part Number CFP2135X-ART

The 2021 International Conference on Computer & Information Sciences (ICCOINS) is the 6th in a series of the conference organised under the umbrella of World Engineering, Science and Technology Congress (ESTCON), Universiti Teknologi PETRONAS, since 2010. ICCOINS2020 will serve as the intersection of industrial expertise, engineers, scientists, academicians, and scholars to disseminate the latest findings from their areas of expertise.

ORGANIZING COMMITTEE

<i>Chairman</i>	Ts Dr Aliza Sarlan
<i>Co-Chairman</i>	Ts AP Dr Ahmad Kamil Mahmood
<i>Secretary</i>	Ts Dr Norshakirah Bt Abdul Aziz AP Dr Dhanapal D. Dominic
<i>Treasury</i>	Ts Dr Khairul Shafee Kalid Ts AP Dr Dayang Rohaya Awang Rambli
<i>Technical</i>	Ts Dr. Rohiza Bt Ahmad Dr Ahmad Sobri Hashim Ts AP Dr Toni Anwar Dr Nordin Zakaria
<i>Publication</i>	Ts Dr Said Jadid Abdulkadir Ts AP Dr Mohd Fadzil Hassan Ts Dr Suziah Sulaiman Ts Saipunidzam B Mahamad
<i>Sponsorship</i>	AP Dr Manzoor Ahmed Hashmani Dr Izzatdin B Abd Aziz Ts AP Dr Wan Fatimah Bt Wan Ahmad Ts Faizal B Ahmad Fadzil
<i>Publicity & Protocol</i>	Ts Dr Shuib b Basri Ts Ahmad Izuddin B Zainal Abidin Ts Jale B Ahmad
<i>IT & Media</i>	Ts Dr Hitham Seddiq Alhassan Alhussian Ts Dr Helmi Md Rais
<i>Event</i>	Ts Dr Mazeyanti Bt M Ariffin Ts Dr. Savita A/P K. Sugathan Ts Dr Emelia Akashah Bt Patah Akhir
<i>Logistic</i>	Ts Dr Lukman Abd Rahim Ts AP Dr Low Tan Jung
<i>Secretariat</i>	Ts Abdullah Sani Abd Rahman Nurulhuda Hashim Safinaz Hamzah Ts Nazleeni Samiha Bt Haron
<i>Technical Sponsor</i>	IEEE Computational Intelligence Society, Malaysia Chapter

Contents

Paper & Author(s)	page	Filename
Towards Improved Data Analytics Through Usability Enhancement of Unstructured Big Data <i>Dr. Rehan Akbar, Ms. Kiran Adnan and Dr. Khor Siak Wang</i>	1	1570622670.pdf
Investigation on IoT Intrusion Detection in Wireless Environment <i>Dr. Vasaki Ponnusamy and Dr. Bobby Sharma</i>	7	1570624265.pdf
A Proposed Gamification Elements of Educational Games <i>Monther M. Elalsh, Mahmood Hussain, Nor Liyana Mohd Shuib, Wan Fatimah Wan Ahmad and Katrin Becker</i>	14	1570624541.pdf
Mobile Application for Student Handbook Based on the Android Operating System <i>Mr. Yunus Adam Abiodun, Mr. Usman Isyaku Bature, Mr. Danladi Muhammad Sani, Mr. Josiah Nkom Lawrence and Mr. Nura Musa Tahir</i>	18	1570625944.pdf
Smart Agriculture with Intelligent Transportation System for Sustainable Future Cities <i>Dr. Hock Guan Goh, Dr. Andrew Hamilton, Dr. Ming-Lee Gan and Prof. Ivan Andonovic</i>	24	1570625972.pdf
Analysis User Interface: Mobile Application to Blended Learning Model <i>Mrs. S. Astuti, Mrs. I. Ratna Ermawati, Dr. Wan Fatimah Wan Ahmad and Mr. Mohd Hilmi Hasan</i>	30	1570626811.pdf
Plant Disease Detection Mobile Application Development Using Deep Learning <i>Dr. Hui Fuang Ng, Prof. Chih-Yang Lin, Dr. Joon Huang Chuah, Mr. Hung-Khoon Tan and Prof. Kar Hang Leung</i>	34	1570626827.pdf
Development of Blended Learning Media Using Character-Based Flipbook Smartphone <i>Mrs. I. Ratna Ermawati</i>	39	1570627161.pdf
Analysis of Effectiveness Character Value in Blended Learning <i>Mrs. Onny Fitriana Sitorus, Dr. Wan Fatimah Wan Ahmad, Mr. Mohd Hilmi Hasan and Mrs. Meyta D. Kurniasih</i>	43	1570627246.pdf
Health Clinic System with e-Health and Android Technology for University in Saudi Arabia <i>Ms. Fatimah Ayed Albrahimi Aljohani, Ms. Aseel Abdullah Alfaldi and Dr. Soperi Zahid</i>	47	1570627264.pdf
Factors Influencing Continuance Intention of E-commerce Among SMEs in Northern Region of Malaysia <i>Dr. Seng Chee Lim, Ms. Xiu Ying Pan, Dr. Seng Poh Lim, Dr. Chen Kang Lee, Ms. Jol San Tan and Mr. Lim Jit Theam</i>	53	1570627449.pdf

Paper & Author(s)	page	Filename
Barriers to Adoption of Industry 4.0 in Manufacturing Sector <i>Mr. Hafiz Mudassir Rehman, Dr. Au Yong Hui Nee, Dr. Yuen Onn Choong and Dr. Mobashar Rehman</i>	59	1570627517.pdf
The Effect of Character-Based Teaching Flipbook Media on the Result of Calculus Learning <i>Mrs. Meyta D. Kurniasih, Mrs. I. Ratna Ermawati, Mrs. S. Astuti, Mrs. Onny Fitriana Sitorus and Dr. Wan Fatimah Wan Ahmad</i>	65	1570627526.pdf
Segmented Region Based Reconstruction of Magnetic Resonance Image <i>Mr. Muhammad Faris, Dr. Tariq Javid, Dr. Syed Sajjad Hussain Rizvi and Mr. Arshad Aziz</i>	68	1570627583.pdf
Fine-Grained Emotion Classification: Class Imbalance Effects on Classifier Performance <i>Dr. Jasy Suet Yan Liew and Dr. Howard Turtle</i>	74	1570627693.pdf
Investigating Communication Approach for Physically-Disabled Children Using Assistive Technologies <i>Mrs. Azhana Ahmad, Mr. Adzly Anuar, Mrs. Zailani Ibrahim and Mr. Thinish Parasuraman</i>	80	1570627974.pdf
Invariant of AES Algorithm Implementations Against Side Channel Attacks in IoT Devices <i>Mrs. Nadia Mustaqim Ansari, Dr. Rashid Hussain, Dr. Syed Sajjad Hussain Rizvi and Dr. Sheeraz Arif</i>	84	1570628915.pdf
Smart Rat Trap <i>Mr. Muhammad Safarruddin Mohd Nazri and Dr. Aliza Sarlan</i>	90	1570629074.pdf
Multimedia Elements in Designing Mobile Apps Interface for Autistic Children: Proxy User Perspective <i>Ms. Nadiyah Mohamad Sofian, Dr. Ahmad Sobri Hashim and Dr. Aliza Sarlan</i>	96	1570629111.pdf
Parametric Evaluation of Improved Deep Learning Networks for Musculoskeletal Disorder Classification <i>Dr. Syed Sajjad Hussain Rizvi, Ms. Sadia Nazim, Dr. Muhammad MoInuddin, Dr. Muhammad Zubair and Dr. Muhammad Rizwan Tanweer</i>	102	1570629365.pdf
Solar-Wind Hybrid Energy Generation System MPPT Using Perturb and Observe (P&O) Algorithm <i>Dr. Rashid Hussain, Dr. Ahmed Sikander, Dr. Sheeraz Arif and Mr. Muhammad Umair</i>	109	1570629779.pdf
A Neoteric Variant of Deep Learning Network for Chest Radiograph Automated Annotation <i>Dr. Syed Sajjad Hussain Rizvi, Ms. Saima Sultana, Dr. Fayez al Fayez, Mr. Muhammad Umair and Dr. Manzoor Ahmed Hashmani</i>	114	1570629943.pdf

Paper & Author(s)	page	Filename
Challenges In Requirement Management Process: An Overview <i>Ms. Siti Nadzirah Khairuddin, Dr. Aliza Sarlan and Dr. Rohiza Ahmad</i>	120	1570630378.pdf
Application of a Wavelet-based Krylov Subspace Algorithm on Digital Signal Convergence <i>Dr. Ahmed Sikander, Dr. Syed Sajjad Hussain Rizvi, Dr. Rashid Hussain, Dr. Sheeraz Arif and Dr. Jawwad Ahmad</i>	125	1570630400.pdf
Fast Regression Convolutional Neural Network for Visual Crowd Counting <i>Mr. Shen Khang Teoh, Dr. Vool Voon Yap and Dr. Humaira Nisar</i>	131	1570631475.pdf
A Novel Approach to Detect Concept Drift Using Mutual Information Based Clustering <i>Dr. Syed Sajjad Hussain Rizvi, Dr. Manzoor Ahmed Hashmani, Vall Uddin, Mr. Tayyab Ansari and Mr. Syed Muslim Jameel</i>	136	1570631796.pdf
A New Framework of Smart System for Inventory Management, Stock Item Locator and Navigation <i>Dr. Nur Diyana Binti Kamarudin</i>	142	1570633224.pdf
A Conceptual Model of Military Blockchain for Repair Parts Supply Chain Management <i>Dr. Syarifah Bahiyah Rahayu</i>	146	1570633226.pdf
A Scalable Blockchain Consensus Model <i>Mr. Dodo Khan, Dr. Tang Jung Low and Dr. Manzoor Ahmed Hashmani</i>	151	1570633935.pdf
Advanced Data Analytics and Supervised Machine Learning in Optics Engineering Analysis <i>Ms. Lai Mun Choong and Mr. Wei Kuang Cheng</i>	157	1570634191.pdf
Machine Learning In Failure Analysis of Optical Transceiver Manufacturing Process <i>Ms. Lai Mun Choong and Mr. Wei Kuang Cheng</i>	160	1570634194.pdf
Exploring Children User Experience In Designing Educational Mobile Application <i>Dr. Khairul Shafee Kalid, Dr. KS Savita and Ms. Kiranjeet Kaur</i>	163	1570634365.pdf
Financial Time Series Forecasting with Hybrid ARIMA-Continuous Wavelet Transform <i>Mr. Heng Yew Lee, Dr. Woan Lin Beh and Dr. Kong Hoong Lem</i>	169	1570634589.pdf
Proposed Acceptance Framework of Online Learning Platform for Urban Poor <i>Ms. Normadia Binti Azhar, Dr. Wan Fatimah Wan Ahmad and Prof. Zalnab Abu Bakar</i>	174	1570634723.pdf

Paper & Author(s)	page	Filename
The Development of Digital Books of Islamic Science Integration on Respiratory System Materials Mrs. Maryanti Maryanti and Mrs. Camelia Safitri	180	1570634734.pdf
Evaluation of Blockchain Algorithm for Smart Rental Application Using Smart Contract Mr. Yong Han Keith, Mr. Faizal Ahmad Fadziil and Mr. Izuddin Zainal-Abidin	185	1570634736.pdf
Comparative Study on the Readiness of Mobile Learning Application in Learning Wan Fatimah Wan Ahmad, I. Ratna Ermawati, Sri Astuti, Meyta D. Kurniasih and Hilmi Hassan	191	1570634740.pdf
Exploring User Preferences on eText Interface Design to Support Reading Among Low Vision Elders Ms. Wan Anis Izzati Wan Affandi Azam, Dr. Suziah Sulaiman, Dr. Dayang Rohaya Awang Rambli and Ms. Oi Mean Foong	195	1570634758.pdf
Interference-aware Wireless Internet of Things Gateway Placement Scheme Mr. Teik Boon Tan, Dr. Boon Yalk Ooi, Dr. Soung Yue Liew and Mr. Zan Wei Kong	201	1570634769.pdf
Design and Implementation of Deep Learning Core for FPGA Platform Mr. Jin Chuan See, Dr. Jing Jing Chang, Dr. Hui Fuang Ng, Mr. Kai Ming Mok and Dr. Wei Kong Lee	207	1570634776.pdf
Multi-population Genetic Algorithm for Rich Vehicle Routing Problems Mr. Joseph Mabor Agany Manyel, Dr. Kwang Hooi Yew and Dr. Nordin Zakaria	213	1570634833.pdf
Critical Literature Review of Named Entity Recognition in Symbol Spotting Mr. Kai Bin Ong and Dr. Kwang Hooi Yew	220	1570634846.pdf
Accounting-based Digital Payment Systems for SMEs Prof. Ridwan Sanjaya, Dr. Theresia Dwi Hastuti, Mrs and Mr. Freddy Koeswoyo	226	1570634879.pdf
Review on Secure Device to Device Communications in LTE Ms. Robithoh Annur	230	1570634888.pdf
Virtual Assistant to Suicide Prevention in Individuals with Borderline Personality Disorder Dr. Wibowo Christin and Prof. Ridwan Sanjaya	234	1570634984.pdf
A Review Towards Deep Learning for Sentiment Analysis Mr. Hoong-Cheng Soong, Dr. Ramesh Ayyasamy and Dr. Rehan Akbar	238	1570635017.pdf

Paper & Author(s)	page	Filename
The Differences in Students Mathematical Resolution Ability Assisted by Geogebra <i>Ms. Nurafni Nurafni</i>	244	1570635104.pdf
The Investment Opportunity, Information Technology and Financial Performance of SMEs <i>Dr. Theresia Dwi Hastuti, Mrs. Prof. Ridwan Sanjaya and Mr. Freddy Koeswoyo</i>	247	1570635159.pdf
Investor Style in Stock Investment Decisions <i>Dr. Elizabeth Lucky Maretha, Dr. Kristiana Haryanti, Dr. Widuri Kurniasari and Mr. Y. Wisnu Sasmito</i>	252	1570635203.pdf
The Development of the Educational Contents and Framework for Disaster Mitigation in Indonesia <i>Dr. KS Savita, Mr. Gary Foo Xiang G, Dr. Maythem Kamal Abbas Al-Adilee, Dr. Jebul Suroso, Ms. Susana Widyaningsih and Ms. Sri Suparti</i>	258	1570635228.pdf
Cost-Effective Scraping and Processing of Real-time Traffic Data for Route Planning <i>Mr. Hong Le Tee, Dr. Soung Yue Liew, Mr. Chee Slang Wong and Dr. Boon Yalk Ooi</i>	264	1570635252.pdf
Collaborative Visualization Framework for Cross-field Working Group <i>Mr. Danial Ilman Muhammad Hasni and Dr. Aliza Sarlan</i>	270	1570635326.pdf
Immersive and Non-Immersive VR Display Using Nature Theme as Therapy in Reducing Work Stress <i>Mrs. Marlina Binti Abdul Manaf</i>	276	1570635338.pdf
Designing A Use Case Diagram for Developing an Electricity Consumption (EC) System <i>Dr. Suhaimi Rahman, Dr. Wahidah Hashim and Mr. Azlan Yusof</i>	282	1570635353.pdf
Student Interest in Understanding European History Through the Museum Virtual Tour 360 <i>Dr. Desvian Bandarsyah and Mr. Sulaeman</i>	286	1570635385.pdf
AE Source Localization for Oil & Gas Pipelines Using Machine Learning Technique <i>Mr. Farrukh Hassan, Dr. Ahmad Kamli Mahmood, Dr. Norashikin Yahya and Mr. Md. Alam</i>	289	1570635386.pdf
Social Influence on the Use of Social Media Towards Environmental Sustainability Awareness in HE <i>Ms. Abeer Abdullah Abdulmajid Mohammed and Dr. Dhanapal Dural Dominic</i>	294	1570635399.pdf
Predictive Learning Analytics (PLA) for Higher Level: A Systematic Literature Review <i>Ms. Nur Aisyah Nurhadi and Mrs. Noreen Arshad</i>	300	1570635445.pdf

Paper & Author(s)	page	Filename
Superlinear Speedup on GPGPU Using Laplacian Algorithm with Convolution Filtering as A Case Study Dr. Mogana Vadiveloo, Mr. Mishal Almazrooe and Prof. Rosni Abdullah	305	1570635450.pdf
Metoccean Prediction Using Hadoop, Spark & R Ms. Sumayema Kabir Ricky and Dr. Lukman Ab. Rahim	312	1570635641.pdf
Network-Level Behavioral Malware Analysis Model Based on Bayesian Network Dr. Mohammad Hafiz Mohd Yusof and Dr. Abdullah Mohd. Zin	316	1570635659.pdf
Image Processing for Enhanced OMR Answer Matching Precision Ms. Jing Yi Tow, Dr. Kwang Hooi Yew and Mr. Kai Bin Ong	322	1570638026.pdf
Decentralized Application for managing the disaster with Blockchain, Cloud & IOT Dr. B Sreedevi, Mr. E. Stephen Samraj, Mr. S. Kamlesh Kumar	328	1570638132.pdf
Sensory Feedback and Interactivity: Enhancing Motivation and Engagement for VR Stroke Rehabilitation Ms. Fatin Shamimi Mohd Zuki, Dr. Suziah Sulaiman, Assoc. Prof. Dr. Dayang Rohaya Awang Rambli, Prof. Dr. Frédéric Merienne and Assoc. Prof. Dr. Mohamad Naufal Mohamad Saad	333	1570638252.pdf
Extended TAM and TTF Model: A Framework for the 21st Century Teaching and Learning Ms. Thian Li Lim and Dr. Angela Siew-Hoong Lee	339	1570638333.pdf
Text Simplification for Malay Corpus: A Review Mrs. Salehah Omar, Dr. Juhalda Abu Bakar, Dr. Maslinda Mohd Nadzir, Dr. Nor Hazlyna Harun and Dr. Nooraini Yusoff	345	1570638454.pdf
A GA Approach to Optimization of Convolution Neural Network Mr. Pradeep Naulia, Dr. Izzatdin Abdul Aziz, Prof. Junzo Watada and Dr. Arunava Roy	351	1570638530.pdf
Predicting Student's Performance Using Machine Learning Methods: A Systematic Literature Review Mr. Yahia Baashar, Mr. Gamal Alkaws, Ms. Nor'ashikin Ail, Dr. Hitham Alhussian and Dr. Hussein Tiawi Bahboub	357	1570638564.pdf
Implementation of CRMS in Healthcare: An Actor-Network Theory (ANT) Perception Mr. Yahia Baashar, Mr. Gamal Alkaws, Dr. Hitham Alhussian and Dr. Hussein Tiawi Bahboub	363	1570638569.pdf
Factors Influencing Blockchain Adoption in Government Organization: A Proposed Framework Miza Shazwani Kamarulzaman, Dr. Noor Hafizah Hassan, Dr. Nur Azaliah Abu Bakar, Dr. Nurazeen Maarop, Dr. Norshakirah Aziz and Mr. Ganthan Narayana Samy	366	1570638570.pdf

Paper & Author(s)	page	Filename
A Hadoop Allied Security Platform for Seismic Big Data Processing <i>Dr. Shiladitya Bhattacharjee and Dr. Lukman Ab. Rahim</i>	372	1570638572.pdf
Formulating Infrastructure Maturity Model for Disaster Management <i>Ms. Aliza Abdul Latif, Dr. Noor Habibah Arshad and Dr. Norjansalika Janom</i>	378	1570694963.pdf
Lockdown Strategy to Control Covid-19 Pandemic Using Automata <i>Ms. Shagufta Jabeen, Dr. Tauqeer Safdar Malik and Mr. Mohd Hilmi Hasan</i>	384	1570698939.pdf
Share Buyback Prediction Using LSTM on Malaysian Stock Market <i>Mr. Muhammad Zahid Hilmi, Dr. Ahmad Kamil Mahmood, Dr. Abdul Moln, Dr. Sutrisno and Dr. Toni Anwar,</i>	390	1570712934.pdf
Design Pattern Based Distribution of Microservices in Cloud Computing Environment <i>Mr. Abdul Saboor, Dr. Ahmad Kamil Mahmood, Mr. Mohd Fadzil Hassan, Dr. Syed Nasir Shah, Mr. Farrukh Hassan and Mr. Muhammad Aadil Siddiqui</i>	396	1570713709.pdf

← → ↻ ieeexplore.ieee.org/xpl/conhome/9497067/proceeding

IEEE.org | IEEE Xplore | IEEE-SA | IEEE Spectrum | More Sites SUBSCRIBE Cart Create Account Personal Sign In

IEEE Xplore® Browse ▾ My Settings ▾ Help ▾ Institutional Sign In IEEE

All Search within Publication ADVANCED SEARCH

Browse Conferences > International Conference on Co... > 2021 International Conference ... ?

International Conference on Computer and Information Sciences (ICCOINS)

Copy Persistent Link Browse Title List Sign up for Conference Alerts

Proceedings All Proceedings Popular

2021 International Conference on Computer & Information Sciences (ICCOINS) DOI: 10.1109/ICCOINS49721.2021

Search within results Per Page: 25 ▾ | Export ▾ | Email Selected Results Feedback

LINK: <https://ieeexplore.ieee.org/xpl/conhome/9497067/proceeding>

DOI: [10.1109/ICCOINS49721.2021](https://doi.org/10.1109/ICCOINS49721.2021) (Proceeding)

Investor Style in Stock Investment Decisions

Publisher: IEEE

[Cite This](#)

[PDF](#)

Elizabeth Lucky Maretha Sitinjak ; Kristiana Haryanti ; Yohanes Wisnu Djati Sasmito ; Widuri Kurniasari [All Authors](#)



Abstract

Document Sections

- I. Introduction
- II. Ease of Use
- III. Methodology
- IV. Results
- V. Conclusion

Authors

Figures

References

Keywords

Footnotes

Abstract:

Every investor has different investment behavior. These differences are called investor style. Investor style can be different because of demography, personality, and different transaction times. The purpose of this study is to reduce the mistakes made by individual investors style. Some of the methods used in this research are Analytical Hierarchy Process (AHP), secondary data, Focus Group Discussion (FGD), and stock simulation with algorithm. All of these methods emphasize the decision making process when buying and selling stocks. The results provide a set of price targets and types of stocks purchased. Accounting information remains the main ingredient for making these decisions. Accounting information that is often used is Price Book Value (PBV) to select undervalued stocks. Additional results from depth interviews, average return obtained based on the time horizon, the beginning of the transaction up to 1 year has a stock return of around 2-4 percent. A time horizon of 1-3 years will get a return of around 10 percent. Time horizon of more than 3 years, stock returns will rise again. The average long-term stock investment is around 20 percent. Personalities based on Dominance, influence, Steadiness, Conscientiousness (DISC) that fit the stock investment style tend to be a precisionist personality, a style of investor that systematically follows existing trading orders. The stock simulation method also uses a trading algorithm with stages according to the AHP results, in order to be able to see the investment style of stocks in the Indonesian capital market.

Published in: 2021 International Conference on Computer & Information Sciences (ICCOINS)

Date of Conference: 13-15 July 2021

DOI: 10.1109/ICCOINS49721.2021.9497231

Date Added to IEEE Xplore: 30 July 2021

Publisher: IEEE

► **ISBN Information:**

Conference Location: Kuching, Malaysia

► **Funding Agency:**

Investor Style in Stock Investment Decisions

Elizabeth Lucky Maretha Sitinjak
Accounting Department,
Soegijapranata Chatolic University,
Semarang, Indonesia
lucky@unika.ac.id or 1764445

Kristiana Haryanti
Psychology Department,
Soegijapranata Chatolic University,
Semarang, Indonesia
kristiana@unika.ac.id

Widuri Kurniasari
Management Department,
Soegijapranata Chatolic University,
Semarang, Indonesia
widuri@unika.ac.id

Yohanes Wisnu Djati Sasmito
Management Department,
Soegijapranata Chatolic University,
Semarang, Indonesia
wisnu@unika.ac.id

Abstract - Every investor has different investment behavior. These differences are called investor style. Investor style can be different because of demography, personality, and different transaction times. The purpose of this study is to reduce the mistakes made by individual investors style. Some of the methods used in this research are Analytical Hierarchy Process (AHP), secondary data, Focus Group Discussion (FGD), and stock simulation with algorithm. All of these methods emphasize the decision making process when buying and selling stocks. The results provide a set of price targets and types of stocks purchased. Accounting information remains the main ingredient for making these decisions. Accounting information that is often used is Price Book Value (PBV) to select undervalued stocks. Additional results from depth interviews, average return obtained based on the time horizon, the beginning of the transaction up to 1 year has a stock return of around 2-4 percent. A time horizon of 1-3 years will get a return of around 10 percent. Time horizon of more than 3 years, stock returns will rise again. The average long-term stock investment is around 20 percent. Personalities based on Dominance, influence, Steadiness, Conscientiousness (DISC) that fit the stock investment style tend to be a precisionist personality, a style of investor that systematically follows existing trading orders. The stock simulation method also uses a trading algorithm with stages according to the AHP results, in order to be able to see the investment style of stocks in the Indonesian capital market.

Keywords - Analytical Hierarchy Process; Accounting Information; Algorithm Simulation Trading; precisionist

I. INTRODUCTION

Humans are having the highest nature in the universe. Humans in science are often referred to as homo economicus, not emotional and fully rational. But not entirely so, humans are homo sapiens who have ambiguous emotions, such as anger, hatred, guilt, shame, pride, regret, joy, sadness, jealousy, greed, fear, and love. This makes the discipline of economics with psychology inseparable, the two disciplines form the cognitive psychology model and the economic model is far more realistic (Turan & Latifi, 2013). This research is also the case, combining investor personality with information that is often given to investors, both investors are still learning to investors who are already proficient.

The behaviour of stock investors is unique enough to continue to be traced. There are two major groups of behaviour that researchers have observed so far. Groups that tend to look for a lot of accounting and company management information are interested in stock investors, and groups that tend to look for the right stock momentum to enter or buy stocks of the company. These two groups are often called rational investors and irrational investors. Rational investors often use fundamental analysis tools rather than technical analysis, whereas irrational investors tend to use technical analysis tools rather than fundamental analysis (Natapura, 2009).

The Nobel Prize in Economics (October 2013) also recognizes the existence of these two different poles. Pole Market Efficient Theory (Eugene F. Fama) and Pole Market Theory Not Efficient by financial behaviour (Robert J. Shiller). Market-efficient theory emphasizes information has power (information of the past, present and future) in making a decision, if the market provides information, then the market reacts quickly (a strong form of efficiency). While Inefficient Market Theory, there is an information bias for individual investors, because there are psychological aspects in decision making. Bias behaviour of individual investors such as overconfidence, over-optimism, representativeness, conservatism, availability of bias, mental accounting, and regret aversion (Byrne & Brooks, 2008).

Previous research that has been done by researchers relating to the behaviour of capital market investors is, stock investors are still considering the annual financial statements issued by issuers at the end of March or early April as part of decision making (Maretha, 2013). The annual financial statements are still relevant as part of the decision making of these stock investors supported by Natapura (2009), Kadariya (2012), Maretha, et all. (2016), in contrast to other studies which say financial statements are not part of decision making in investing in the capital market (Septyanto, 2013). Septyanto (2013) said the benefits of financial information were not significant to revise investor beliefs in buying or selling company stocks. The factors that most influence it is information that is shared by friends, colleagues or family and not directly from the company's performance. This is often called herding behaviour (Banerjee, 2008; Baddeley, 2012).

The two groups and the two poles mentioned above have made researchers develop investor behaviour towards personalities, company life cycles, and company valuations that have been listed on the Indonesia Stock Exchange (IDX). Researchers see that there are three large groups of companies listed on the IDX, namely BUMN (4.8%), BUMD companies (0.6%) and Private companies (94.7%). These three groups of companies have different characteristics in giving corporate actions. BUMN and BUMD companies often give part of their profits to investors in the form of dividends. However, the BUMD sometimes gives a slightly greater dividend than a BUMN. This is due to the fact that most of the stocks owned by BUMD companies are held by investors who are in the area, while the majority of BUMNs are owned throughout the archipelago.

Three major groups of companies listed on the IDX will first be mapped to the company's life cycle. Mapping starts from a new company listed on the IDX or an Initial Public Offering (IPO) entering the start-up stage, then the company enters the growth stage, after which the company enters the maturity stage, and also maps the companies that decline (decline). Mapping the company is done by looking at the company's cash flow over the past three years. After mapping the company's life cycle, researchers will enter into the valuation of the company's valuation or the valuation of its assets. The purpose of researchers doing this, researchers will create a model of stock investor behaviour that shows the two different poles. Mapping data is the basis for asking individual investors the decision to make a purchase, sale, or hold.

II. EASE OF USE

A. Market Information

Lipe (1998) uses accounting information and market information in risk assessment and making investment decisions. His experimental study examined the risk considerations and decisions of individual investors to invest influenced by variables (yield variance and yield covariance with market yields) and accounting risk measurement. The accounting data used in his study are in the form of current ratios, solvency ratios, and profitability ratios over the past five years, as well as market data in the form of market indexes for the past five years. The results of his study said variance, covariance, yield expectations have an effect on investment decisions and risk assessment.

This study provides an overview of investment strategies that are often used by scholars is a top down analysis. Therefore, researchers provide a macroeconomic picture that directly impacts the capital market to individual investors. Macroeconomic data shown are GDP, inflation, and interest rate. Then, given industry information that can be seen virtually with technical analysis. Furthermore, the performance of companies that want to be purchased such as Price Book Value (PBV), Return on Assets (ROA), Return on Equity (ROE), and undervalues or overvalues of Price Earnings Ratio (PER).

Figure 1 shows the main trading display will be divided into 2 moments, both based on the information presented to the research subjects. The first display during the initial 15 minutes of the information presented is more technical in nature. Meanwhile, in the next 15 minutes the display will

change with more informational content to the company's fundamentals. Figure 1 also shows the initial interface in the main menu of the HiFu software, simulating the first 15 minutes of stock trading.



Figure 1: Market Information in Stock Simulation

Source: HiFu Simulation Program (2019)

B. Accounting Information

Behavioural accounting research emerged in the 1950s to the present. The focus of his research, investigates how users of accounting information make decisions and what information they need.

Research related to capital markets and accounting often uses Kothari (2001) which says there is a relationship between capital markets and financial statements. The main sources of empirical research demand in the capital market in accounting are fundamental analysis, valuation, and market efficiency testing. Fundamental analysis using financial ratios to predict future profits, using the time-series forecasting method and forecasting analysis. As a result, ratios can predict revenue growth. The size of existing ratios also predicts trading strategies by exploiting information about revenue growth. This revenue prediction signal also produces abnormal returns. Then the inefficient market also requires accounting information in the company's financial statements.

Lawrence and Kerckmar (1999) research on the process of tracking information selection activities by decision makers is used to assess the importance of accounting-based, market-based, and analyst-based information in investment decisions. The steps taken are through a number of questions, such as: What information is considered for general information? How to select useful information? What judgment or decision was made?

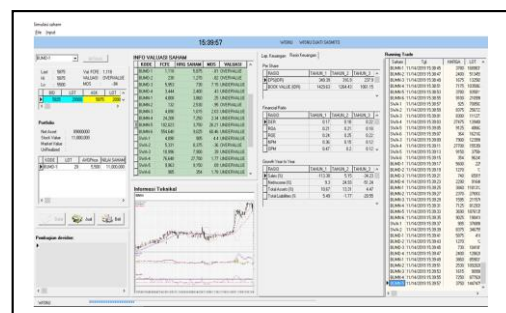


Figure 2: Accounting Information in Stock Simulation

Source: HiFu Simulation Program (2019)

Figure 2 shows the main trading menu display there is some important information. First, related to the regional government stock code (BUMD-1). Information about

prices, portfolios, dividend distribution, technical information and information on macroeconomic conditions. Technical information will refer to the selected stock code, so that if the code is changed, the technical information will change according to the stock code that appears. Second, related to the code of stocks owned by the state (BUMN), as well as private stocks. Meanwhile, running trading moves according to the daily transaction data that has been entered in the system. The stock price will change according to the stock price value that appeared last in running trading. The time needed for each subject is approximately 30 minutes. The time indicator can be seen from the movement of the status bar. The status bar is at the bottom of the main stock trading simulation application program display. The main display of the HiFu stock trading software after the next 15 minutes will look like in Figure 2.

Figure 3: Accounting Information and Technical Analysis

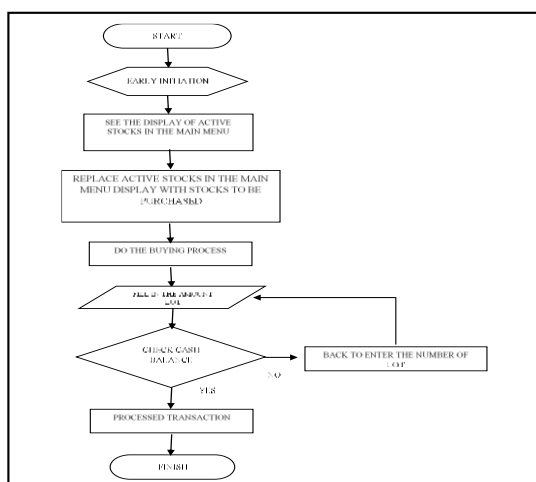


Source: HiFu Smulation Program (2019)

Figure 3 shows technical information and fundamental information more clearly. Research subjects can be done right click on the graphic image of technical information. The display can also be used to compare two stocks at once by selecting multiple stocks. This can be done, if the menu bar appears after right-clicking on the chart of fundamental information. The display above will change according to the desired stock code option. This information aspect will provide an overview of the historical conditions of the stocks that are the samples of this experimental research.

To carry out the process of buying and selling stocks, you can click on the buy or sell button in the main view of the trading simulation. The first procedure that must be done by the respondent is to make a purchase first with an investment of Rp. 100,000,000, -. The purchase process can be done by clicking the buy button so that the display will appear as shown in Figure 3.

Figure 4: Algoritma in Stock Buy Transactions

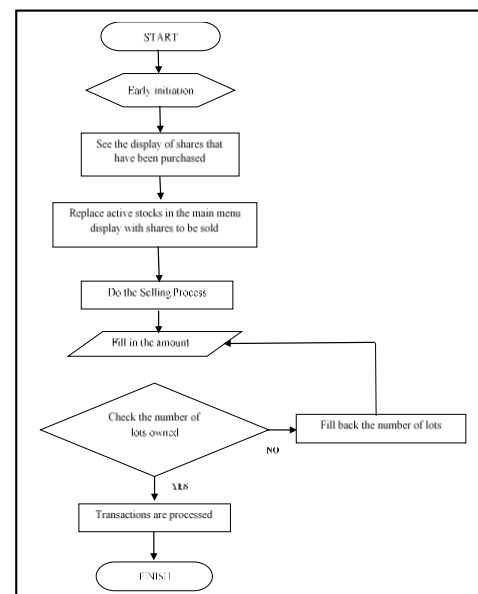


Source: HiFu Smulation Program (2019) Figure 4 shows Client Id,

respondent name, stock code and share price will automatically appear in the form fields. Subjects can change the number of lots to be purchased. This is intended to minimize the possibility of program errors in the calculation of trading results. If you want to change the stock code you want, it must be done from the main trading view by first canceling the buy transaction that will be carried out. The buying process is only limited by the amount of capital, which will automatically decrease if the respondent carries out buying activities.

Figure 5 shows the share selling process is also done by simply determining the number of lots of stocks to be sold. The number of stock lots will be a filter for the respondent, because if the respondent sells more than the number of lots he owns. Therefore, the program will issue a warning and automatically cancel the sale transaction. The main view is important because it is hoped that respondents will see and consider all the information presented, such as fundamental, technical and corporate action (dividend distribution). All transactions that occur are stored immediately.

Figure 5: Algorithm in Stock Sell Transactions

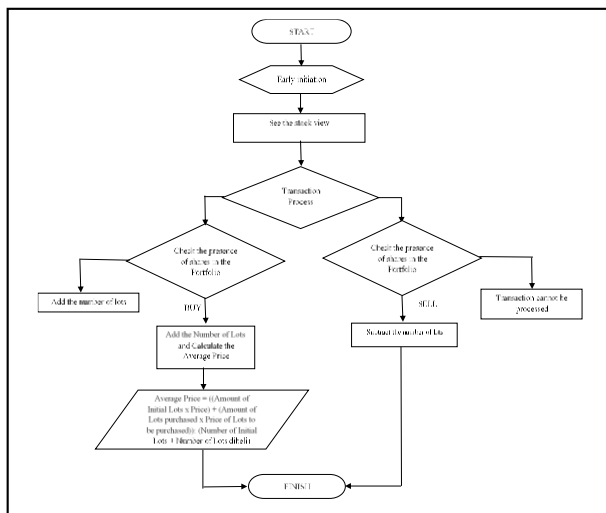


Source: HiFu Smulation Program (2019)

Figure 6 shows building a portfolio, actually an integral part of the buying and selling process in this stock simulation software. The initial process of calculating the formation of a portfolio begins with "initialization" by identifying the number of lots of stocks that have been bought and that have been sold. The results of this identification are the number of stocks in hand with a price that refers to the average price. Changes in portfolio position will occur if investors carry out a buying or selling process. When the buying process is carried out, an examination will be carried out on the existence of stocks owned. If the stocks that have been purchased have been previously owned, the number of lots purchased will be added to the stocks with the same code. Meanwhile, the price will be calculated using the weighted average approach. However, if the identification results of the existing portfolios do not find stocks with the same code as the stocks purchased, the share code will be added directly to both the number of lots and the acquisition price. When

the buying process is successful, it will be continued by reducing the amount of cash in hand, minus the nominal amount of the share purchase. During the share selling process, an examination will be carried out on the presence of stock codes in the portfolio. If the stock is not found then the transaction will be canceled. But if a stock is found then the number of lots in the portfolio will be compared with the number of lots to be sold. The maximum number of lots to be sold is the same as the number of lots in the portfolio. If the number of lots sold is less than or equal to the number of lots in the portfolio, the transaction will take place. The number of lots in the portfolio will decrease as much as the lots sold. Furthermore, the sales proceeds in the form of cash will be added as assets.

Figure 6: Algoritma Portfolio in Stock Simulation



Source: HiFu Smulation Program(2019)

III. METHODOLOGY

This research has three stages, namely filling the DICS personality, simulating buying and selling and holding of stocks, and conducting FGDs so that it can multiply the behaviour of individual investors in the city of Semarang, Indonesia. Besides that, the researcher mapped key words when the FGD became a quantitative variable by distributing investor behaviour questionnaires to individual investors who took stock Trading Algorithm Simulation for 30 minutes.

Each question was also adjusted to the questions posed during the FGD. A FGD is also recorded when recording a discussion about the behaviour of both the investor being observed or the individual investor himself, then the voice recording is done verbatim so that keywords and keyword frequencies appear in each FGD. The next stage is an Analytical Hierarchy Process (AHP) assessment by means of each criterion (table 1).

A. DISC Personality

Some of the measurements of personality one of the measuring tools that are simple in the process, interesting, have good validity and reliability and are quite easy to learn are DISC (Dominance, Influence, Steadiness, Compliance). This DISC test provides a description and character of a person's personality that can predict future behavioural

tendencies. This is obtained from evaluating the main personality factors that exist in a person. DISC provides an advantage in ease of use, because this test only takes a maximum of 15 (fifteen) minutes to complete the twenty-four (24) questions contained therein. This personality test, a person will be confronted with four adjectives in a number and they are asked to choose one word that they think best suits him and one more word that does not suit him best. Expertise interpretation of personality dynamics in this measuring instrument can be seen from the graph is the key to the accuracy of the analysis. When this is available the results of interpretation of the work of DISC can be done by using a software automatically so that it will be very easy for interpreters to know the character of one's personality.

Basically DISC measures a person's personality traits, namely Dominance, Influence, Steadiness, and Compliance, which can show a picture of the tendency of behaviour of an individual. DISC can help understand "why someone does something". Besides that, the dynamics of the dimensions of Dominance, Influencing, Steadiness, and Conscientiousness in each different person form a personal DISC model (style) that can describe each other's behaviour.

B. Focus Discussion Group (FGD)

The FGD was conducted in two sessions, the first session was at noon around 3:00 PM - 4:00 PM Western Indonesia Time (WIB), while the second session was around 5:00 PM - 6:00 PM WIB. Because during the fasting month FGD, the second session was more than the first session, because it was closed by breaking the fast together. The first FGD results, respondents prefer trading rather than holding for too long. Macro information which is often seen by Dow Jones' condition is only the condition of Indonesian politics, not its Macro information. Therefore, researchers conducted other research models that show macro information having an impact on aquatic information and technical information.

FGD was conducted for 30 minutes. Emotion Bias is the experience of buying stocks of BUMN, BUMD and Private having experienced loss aversion, overconfidence, overestimate by using fundamental analysis or technical analysis. Cognition bias is also the same, have you ever experienced the regrets of buying BUMN or BUMD or Private stocks. The information obtained is hoax information (cognitive dissonance) that makes the decision incorrect.

Table 1: Analytical Hierarchy Process

1	Both elements are equally important	Criteria:	1	The behavior of targeted investor & accuracy
3	One element is a little bit more important than the other one		2	Investor behavior, relationship & self-assessment
5	One element is more important than the other one		3	Investor Behavior, Choosing Information & Surrounding Environment
7	One element is far more important than the other one		4	Technical Analysis Behavior
9	Absolutely more important		5	Fundamental Analysis Behavior
2,4,6,8	The mean value between two adjacent options			

Source: Saaty (1987); Sitinjak, et al. (2019)

C. Analytical Hierarchy Process (AHP)

The next stage, AHP test was carried out. This study uses analytical hierarchy process (AHP) for each criterion that is examined. AHP is used to achieve the goal of this research by reducing the behaviour bias of individual investors when buying, selling, or holding stocks. AHP is very suitable with the decision making process that can be made in stages. Each criterion has a different hierarchy for its continuous approach.

The AHP process as a whole has the following stages: (1) Creating a hierarchy model to be questioned; (2) Setting priorities by providing criteria for each level (table 2); (3) Measuring consistency; (4) Evaluating consistency where $CR < 0.1$ (Tabl1 1). After testing with AHP, the results of FGD, AHP and circulating questionnaires, researchers made several models of processed data obtained either by filling out questionnaires, interviews, or mapping behaviour based on the age of experience doing stock investment transactions.

D. Model-Model

The results of the AHP model are seen (Table 2), each decision maker prefers to achieve the target in accordance with the planning that has been done. Investors prefer a good relationship with fellow investors. Individual investors will also enjoy a comfortable environment in conducting transactions. Individual investors will also buy if MA 20 is below MA 50, the decision to sell stocks because prices will move down. Investors also see the level of financial risk in the last 3 years, if it is risky, it will not buy it for investors who are afraid of risk, and vice versa for investors who like risk but can see the future prospects of the performance that will result if financial risk (long-term liabilities) is used to company expansion going forward.

F4 TECHNICAL ANALYSIS		
9	AT07	Investor individu mengerti akan perpotongan garis, dimana MA 20 berada di bawah MA 50, maka keputusannya menjual saham karena harga akan bergerak turun.
7	AF02	Individual investors when choosing shares do not consider the working capital owned by the company to be purchased.
5	AT09	Individual investors see the intersection of lines, where MA 20 is above MA 50, then the decision to buy shares because prices move up
F5 FUNDAMENTAL ANALYSIS		
9	AF06	Individual investors see the stock selection tends to see the level of financial risk in the last 3 years.
7	AF18	Individual investors will make the decision to sell shares if the intrinsic (fair) price is smaller than the market price (overvalued).
5	AF04	Individual investors will see the company selected for stock investment has a smaller proportion of long-term debt than its equity.
3	AF07	Individual investors will make the decision to buy shares when they see how much the manager manages the company's operations to be efficient.

Table 2a: Decision Making Model

Source: Sitinjak, et al. (2019)

The decision model is required to be a model of the process of buying, selling, and holding a stock investment. Stages starting from technical analysis information, see historical data formed by closing prices of stocks. Then see accounting information from

profitability and corporate action taken by the company. The corporate action is in the form of dividends, reverse stock split, and right issues. The final stage of Figure 3 model is the target and accuracy of each information and investment strategy carried out.

Table 2b: Decision Making Model

F1 DM BASE ON TARGET & ACCURACY		
9	PIP14	Individual Investors Trying to Achieve Targets According to Planning
7	PIP15	Individual Investors Trying to Do Precision in Doing the Main Work
5	PIP13	Individual Investors Trying to Have High Accuracy Standards in The Stock Investment Transaction
3	PIP16	Individual Investors Are Trying to Be Comfortable and Liking the Environment When Less Clearly the Regulations So That Can Be Flexible
F2 DM BASE ON RELATION & SELF JUGMENT		
9	PIP03	Individual investors feel uneasy when making decisions that can have a negative impact on others
5	PIP02	Individual investors feel there is a disadvantage, then individual investors will think again on the decisions that have been taken
5	PIP10	Individual investors feel confrontational often with fellow investors or brokers.
F3 DM BASE ON ACCOUNTING INFORMATION & ENVIROMENT CONDITION		
9	PIP04	Individual investors feel like the work environment to be able to make a comfortable stock investment transaction.
7	PIP12	Individual investors feel the need to know in detail and like to look at things that exist in the workplace environment or a place to share transactions.
5	PIP30	Individual investors will buy shares because they understand the accounting information of the shares have a good and profitable performance in the present or future
3	PIP20	Investor individu menyukai perubahan yang mendadak

Source: Sitinjak, et al. (2019)

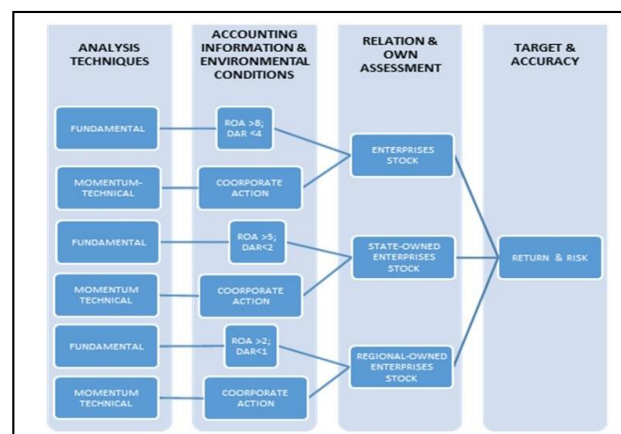
The next stage, the model that emerges is the least-square partial analysis. Where, each variable used such as macro information, accounting information, and technical information is made quantitative and has a possible formula as below.

$$MI = \alpha + \beta AI + \beta_2 TI + \epsilon \dots\dots\dots (i)$$

$$BF = \alpha + \beta AI + \beta_2 TI + \beta_3 PI + \epsilon \dots\dots\dots (ii)$$

Note that the equation is centered using a center tab stop. Be Where: α = Constant; β = Regression Coefficient; BF = Behavior Finance; AI = Accounting Information; TI = Technical Information; PI = Investor Personality; ϵ = Error.

Figure 7: Model of Buying-Selling-Holding Individual Investor



Source: Sitinjak, et al. (2019)

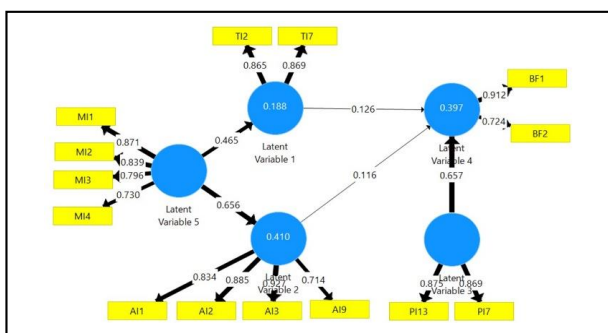
IV. RESULTS

The results of research for personalities, individual investors in the city of Semarang-Indonesia tend to be Precisionist styles (C and S). Precisionist styles is a systematic thinker who tends to follow procedures both in personal and business life. Continue in an orderly manner, the way that has been established. Precisionist is precise in paying attention to details. They acted very wisely, diplomatically and were rarely hostile to their colleagues. Being very thorough, precisionists go to great lengths to achieve accuracy in work and maintain high standards. Precisionist tends to get caught up in details, especially when decisions must be made. They want a standard operating procedure and there are no sudden changes.

As a Precisionist, they like a protected and safe environment that is governed by rules and regulations. A precisionist likes people, but prefers some close friends to be recognized. Precisionist prefers small groups to many people. They will use most of their time to ascertain how precisely they are. Precisionist is too sensitive and might not handle criticism well. They need to develop self-confidence and be more independent. They tend to worry a little about what people think of them and they avoid conflict and change at all costs.

Being precise is very important in all respects for precisionists. They can be relied upon to carry out any task correctly. They want the real facts and figures before they will make a decision. They will feel uncomfortable when forced to make quick decisions. Precisionist will often maintain feelings for themselves. Others may not realize that they have strong beliefs. Precisionist will not explode easily when depressed or stressed, but is likely to withdraw. They want a stable home and work environment that promotes security. The more stable, organized and non-confrontational the environment, the happier it will be.

Figure 8. Model Behavioural Finance Information



Source: Data processed (2019)

The results of the FGDs are three things that are often mentioned, namely, first, macro information is not often used in stock transactions. There are three types of investors, fundamental investors, technical investors, and mix of fundamental and technical investors (hybrid investors). The second discovery in the FGD is that individual investors will form their own investment strategies in the third year. If you remain an investor in the third year, he will reduce his anxiety and doubts when making a stock transaction. The third determination in the FGD, that investors are more inclined to homo sapiens than homo economicus, if there is a crisis occurs or a huge loss, then only investor relations with

Him (the Creator of the Universe) can provide power and enlightenment in stock investment transactions.

Qualitative results are made quantitative, then the individual investor behaviour model shows the investor's personality that forms the pattern of the transaction strategy. Market information is more absorbed in accounting and technical information. When confronted directly with the latent variable macro information on financial behaviour, it has no effect (figure 2). Unlike the second model, macro information affects accounting information and technical information, not directly to the financial behaviour of individual investors.

V. CONCLUSION

Individual investors have a target in investing in stocks. Individual investors also have the accuracy of information that individual investors absorb. Macro information goes into technical and fundamental information, so individual investors are more likely to use their personalities in forming stock investment strategies. Individual investors in Indonesia tend to have precisionist styles (a combination of Compliance and Steadiness.). Precisionist styles is a systematic thinker who tends to follow procedures both in personal and business life. Investor behaviour towards emotions, anxiety, and euphoria will be more manageable when individual investors step into the third year as investors. This is formed in investors from a mixture of personality and learning while buying, selling and holding stock investments.

ACKNOWLEDGMENT

Thank you for RISTEK DIKTI-Indonesia funding this research in 2018 until 2020. This paper is an output of the science project Fundamental Research Grants from the RISTEK DIKTI-Indonesia (Funding in 2019 and 2020).

REFERENCES

- [1] Baddeley. "Working Memory: Theories, Models, and Controversies. Annual Review of Psychology", Vol. 63, pp. 1-29. 2012.
- [2] Byrne & Brooks. "Behavioral Finance: Theories and Evidence". The Research Foundation of CFA Institute Literature Review. 2008.
- [3] Kadariya. "Factors affecting investor decision making: A case of Nepalese capital market". Journal of Research in Economics and International Finance, vol. 1, no.1. 2012.
- [4] Lipe, M. G. "Individual Investors' Risk Judgments and Investment Decisions: The Impact of Accounting and Market Data." Accounting, Organization, and Society, Vol 23, No. 7, pp. 625-640. 1998.
- [5] Maretha, E.L. "Perilaku Investor Individu dalam Pembuatan Keputusan Investasi Saham: Efek Disposisi dan Informasi Akuntansi. Jurnal Organisasi dan Manajemen", vol.9. no.1 Maret, pp. 31-53. 2013.
- [6] Natapura, C. "Analisis Perilaku Investor Institusional dengan Pendekatan Analytical Hierarchy Process (AHP)". Jurnal Ilmu Administrasi dan Organisasi, Sept-Des, Vol.16, No.3. pp. 180-187. 2009.
- [7] Septyanto. "Faktor-Faktor yang mempengaruhi Investor Individu dalam Pengambilan Keputusan Investasi Sekuritas di Bursa Efek Indonesia (BEI)". Jurnal Ekonomi, Vol. 4 No.2. 2013.
- [8] Saaty, R. W. "The Analytic Hierarchy Process-What it is and How it is Used," Mathl Modelling, vol. 9, no. 3-5, pp. 161-176. 1987.
- [9] Sitinjak, E. L. M., K. Haryanti, W. Kumiasari, and Y.W. D. Sasmito. "Investor Behavior Based on Personality and Company Life Cycle", Holistica, vol. 10, issue 2, pp. 493-499. 2019.
- [10] Maretha, E.L., K. Haryanti, & Y. W. Sasmito. "Perilaku Investor Individu berdasarkan Portofolio dan DISC-Personality di Pasar Modal Indonesia. Proceedings of Nasional Conference APMI-Disruptive Innovation. Malang, Indonesia", pp. 119-129. 2016.